HOW INL UNITES WITH UTAH

A concentrated solar energy array at the Toole Army Depot.

Idaho National Laboratory partnerships within the Beehive State illustrate a growing relationship that makes sense both geographically and academically.

Wireless Spectrum Innovation

Partner: University of Utah

Project: Create and simulate new wireless algorithms which are tested with off-the-shelf or custom software and custom radio hardware assembled at INL's Energy Innovation Laboratory in Idaho Falls, then delivered to Salt Lake City for use.

Why: Address limited wireless spectrum resource allocation, create enhanced mobile broadband waveform, and reduce the power needed for wireless communications.

Since: 2012

Who Benefits: Emergency first responders, law enforcement and the military.

Medical Isotope Production

Partner: University of Utah

Project: Nuclear medicine uses tiny radioactive elements to provide diagnostic information about organ functions. Now, the University of Utah, Idaho State University and INL researchers are perfecting a process to reduce the cost and improve the purity of valuable isotopes for prostate, lung, intestinal and pancreatic cancer treatment.

Why: Radiotherapy can be used to treat some medical conditions, especially cancer, using radiation to weaken or destroy targeted cells.

Since: 2018

Who Benefits: The medical community and cancer patients worldwide.

Infrastructure Analysis and Resilience

Partner: Utah Department of Public Safety

Project: Most people don't think about the critical infrastructure in their community – such as the power grid, water treatment plants, or telecommunication networks – until they are forced to go without them. When a disaster strikes, it can cause a chain reaction affecting multiple infrastructures and challenging response and recovery efforts. The INL-developed All Hazards Analysis software provides a way to map and visualize the relationships among vital and vulnerable assets allowing first responders to prepare in advance for disruptions.

Why: As communities grow and evolve into complex networks of facilities, services and personnel, it's increasingly challenging for emergency managers to know how disruptions caused by natural disasters or cyberattacks will affect infrastructure systems or supply chains.

Since: 2019

Who Benefits: Emergency first responders, public administrators, critical decision-makers

Grid Cybersecurity and Resilience

Partner: University of Utah & PacifiCorp

Project: Power outages caused by natural or man-made events can be disruptive, causing health and safety risks for residents and upending economic activity. Researchers supporting the Department of Energy's Solar-Assisted State-Aware and Resilient infrastructure System project are developing and demonstrating real-time detection technology to help quickly bring the grid back online following a fault or outage.

Why: The project enables grid operators to integrate increasing amounts of solar generation onto the grid in a cost-effective, secure, resilient and reliable manner.

Since: 2019

Who Benefits: Electric power owners and operators, electricity consumers

Radiological Response Training

Partner: Utah National Guard and the FBI

Project: When large, public activities – such as political conventions or major sporting events – call for intense security planning, special military units and federal law enforcement officers are deployed. Those events often involve tactics, techniques and procedures aimed at detecting and responding to radiological materials and hazards. For more than a decade, INL has provided the military and law enforcement with hands-on training to safeguard the public from these threats.

Why: Radiological hazards pose a significant threat to national security and the public. INL's expertise in nuclear materials handling, along with our specialized training ranges, allow first responders to get the hands-on training necessary to accomplish their mission.

Since: 2004

Who Benefits: First responders including law enforcement and the military

Wireless Security Research

Partner: University of Utah

Project: Advanced wireless communication technology – including 5G or millimeter wave capable devices – offer unprecedented connection speeds and reliability making buffering and lag time a thing of the past. This means nearly ever consumer product from smart home appliances to drones and event autonomous vehicles will operate over-the-air. In partnership with the University of Utah, INL researchers are working to make sure this wireless technology is secure.

Why: As more devices incorporate wireless options, the risk of a critical disruption increases. Dropped calls are inconvtenient, but if an autonomous vehicle with upwards of 200 wireless sensors loses cellular connectivity the safety risks are exponentially more significant.

Since: 2016

Who Benefits: Anyone using wireless communication technology

Geothermal Research

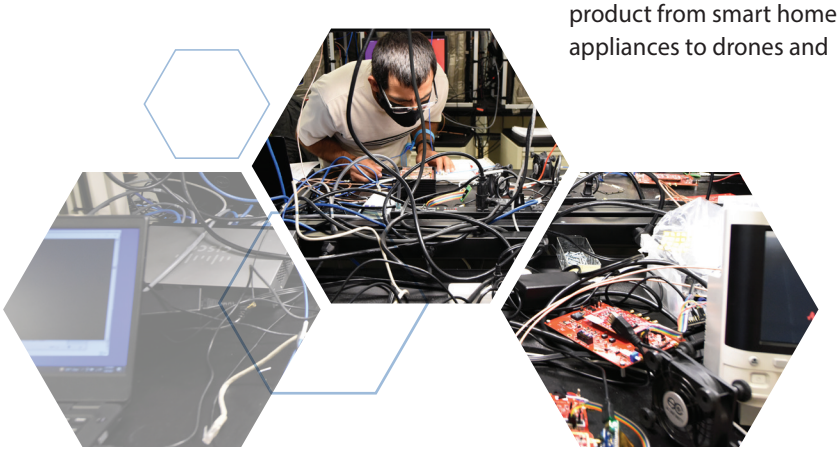
Partner: University of Utah-led team

Since: 2018

Project: A field laboratory for accelerating breakthroughs in enhanced geothermal system (EGS) technologies to advance the use of geothermal resources around the world.

Why: By drilling wells into the hot subsurface rock and injecting fluid horizontally to open fractures, EGS enables heated water to be brought back to the surface to generate electricity or provide process heat.

Who benefits: EGS has the potential to provide 100 gigawatts of electricity to more than 100 million American homes.



Cybersecurity Research

Partner: Utah State University

Project: Cybersecurity is an important aspect of nearly every industry. With more people embracing electric vehicles, hackers have demonstrated the ability to infect charging stations with malware and take control of vehicles once they plug-in to refuel. Researchers at Utah State University are collaborating with INL engineers and the automotive industry on ways to secure electric vehicle charging infrastructure to ensure electrified transportation is more secure from cyber threats.

Why: Electrified transportation has shown promise to reduce carbon emissions associated with climate change. With just over a million electric vehicles on the road, and many more soon to follow, regulators, consumers and governments have an interest in ensuring the technology is not just safe, but secure.

Since: 2019

Who Benefits: The automotive industry and anyone driving an electric vehicle

Electric Vehicle Charging Infrastructure

Partner: PacifiCorp, Rocky Mountain Power

Since: 2017

Project: Locate a network of fast charging stations on 1,500 miles of interstate in Utah, Wyoming and Idaho. Before suggesting charging locations, INL worked with University of Utah and Utah State University to collect and analyze data. The project also involves installing Level 2 chargers at homes, housing complexes and businesses.

Why: One of the biggest impediments to mass adoption of electric vehicles is a lack of charging infrastructure. This is particular acute in the rural parts of the country, predominantly in the western part of the United States. This project looks to identify optimal locations and distances for charging infrastructure.

Who benefits: Electric vehicle drivers.

Wind, Solar, Battery Storage

Partner: U.S. Army

Since: 2015

Project: INL assisted with a design review, planning and analysis for 1.7- and 1.5-megawatt wind projects, 1.5-megawatt concentrated solar project upgrades, a power system study, and a microgrid at Tooele Army Depot.

Why: The Defense Department has embraced renewable energy as essential to reducing dependence on foreign oil, addressing climate change concerns, improving security and reducing costs.

Who benefits: U.S. Department of Defense.

Advanced Nuclear Reactors

Partner: University of Utah

Since: October 2018

Project: DOE's Office of Nuclear Energy allocated $450,000 to the University of Utah to develop an experiment vehicle for analyzing the chemistry of irradiated molten salt.

Why: Help develop instrumentation and tools needed to monitor and conduct experiments in a proposed fast spectrum test reactor to be built at INL or Oak Ridge National Laboratory.

Who benefits: Companies developing next-generation reactors.

High-Performance Computing

Partner: Utah universities

Since: 2012

Project: Utah universities used more than 87 million core hours of supercomputing time on INL's high-performance computers in fiscal year 2021. One project supporting the FORGE collaboration accounted for more than 77 million of those core hours.

Why: Idaho National Laboratory is home to one of the nation's fastest supercomputers capable of processing significant amounts of data that would take people years to complete by hand. When the machine isn't being used for INL research, it's made available to university students working on projects relevant to Department of Energy missions.

Who benefits: Utah university students and research projects

Nuclear Energy Deployment

Partner: Utah Associated Municipal Power Systems

Since: 2014

Project: Operating a small modular reactor power plant using technology being developed by NuScale Power. The plant will have six 77-megawatt modules capable of generating 462 megawatts of electricity.

Why: Part of a long-term strategy to reduce carbon emissions and replace aging coal-fired plants with a nonfossil fueled flexible power generating source. The scalable and modular nature of the project will help utilities back up distributed generation from wind and rooftop solar.

Who benefits: Intermountain West communities and electricity consumers.

Renewable Energy Project

Partner: U.S. Army

Since: 2015

Project: INL helped design and install 2 megawatts of solar photovoltaic, wind, geothermal, microgrid and energy storage systems at Dugway Proving Ground.

Why: The Defense Department has embraced renewable energy as essential to reducing dependence on foreign oil, addressing climate change concerns, improving security and reducing costs.

Who benefits: U.S. Department of Defense.

Academic and Business Partnerships

Partner: Utah universities

Since: 2018

Project: In 2020, INL was host to 28 interns, one graduate fellow, and three adjunct or affiliate faculty from Utah universities. Students from the University of Utah, Utah State University and Brigham Young University have received research funding or scholarships from DOE's Nuclear Energy University Program (NEUP).

In addition, five patents were awarded to INL and Utah-based organizations including Ceramatec, Utah State University and the University of Utah. In the last three years, the lab concluded licensing agreements with Brigham Young University, the University of Utah, and HiFunda LLC, and engaged in seed research with University of Utah and Weber State University.

Why: In 2020, INL spent more than $27 million with Utah businesses and organizations for goods and services necessary for laboratory operations. As bordering states, this relationship makes financial, logistical, and geographic sense. As the laboratory continues to grow, identifying talented workers to fulfil national energy and security missions will also be critical.

Who benefits: Utah university students and businesses.

INL Idaho National Laboratory